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United States
General Accounting Office
Washington, D.C. 20548

General Government Division

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September 10, 1996

The Honorable Daniel Patrick Moynihan
Ranking Minority Member
Committee on Finance
United States Senate

Dear Senator Moynihan:

This letter responds to your request that we describe a methodology mentioned in an opinion article on measuring poverty that appeared in an April 1996 issue of the Wall Street Journal.¹ In that article, the author stated that the official measure of poverty is "fundamentally flawed" and reported research results by Dr. Daniel T. Slesnick, a professor of economics at the University of Texas at Austin. The article reported one set of Dr. Slesnick's results that showed a poverty rate that began at 30.9 percent of the U.S. population for 1947,² declined to 19.3 percent for 1959, and to 2.2 percent for 1989. The official poverty measure's rate began at 22.4 percent for 1959 and declined to 12.8 percent for 1989.³

Specifically, you asked us to describe (1) one of the alternative poverty measures that Dr. Slesnick proposed (Slesnick consumption measure) and elements that differ from the official measure, (2) a methodology that he used to test this alternative measure (PCE-based method), and (3) the sources of data used in that methodology. As agreed, in a later report, we will discuss the use of both income and consumption for measuring economic well-being in determining poverty status and developing contemporary poverty thresholds.

¹Nicholas Eberstadt, "A Poor Measurement," Wall Street Journal, Vol. CCXXVII, No. 79 (Apr. 22, 1996), p. A22.

²This included the civilian noninstitutional population of the United States and members of the Armed Forces in the United States living off post or with their families on post, but excluded all other members of the Armed Forces. Unrelated individuals under 15 years of age, such as foster children, were also excluded.

³Poverty rates have been calculated by the Bureau of the Census using the official measure for 1959 through 1994 and include years prior to the measure's official adoption in 1969.

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We reviewed Dr. Slesnick's research results, which discuss his alternative measures of poverty; examined the methodology he used to test one of these alternative measures; interviewed Dr. Slesnick by telephone; and obtained tabulated data that he used to conduct his analysis. We also contacted the Bureau of Economic Analysis (BEA) of the Department of Commerce and the Bureau of Labor Statistics (BLS) of the Department of Labor and obtained information about the similarities and differences of the two data sources that Dr. Slesnick used in the testing methodology. In addition, we interviewed the author of the Wall Street Journal article.

We limited our review to describing one of Dr. Slesnick's alternatives to the official poverty measure, which serves as the baseline poverty measure in this letter, and the methodology that he used to test this alternative measure, the results of which were described in the Wall Street Journal article. Our review relies on estimates from Dr. Slesnick, BEA, and BLS. We did not independently validate any of the comparisons made by BEA, BLS, or Dr. Slesnick.

We requested comments on a draft of this letter from the Secretary of Labor, the Secretary of Commerce, the Acting Director of the Office of Management and Budget (OMB), and Dr. Daniel T. Slesnick. Their comments are discussed at the end of this letter.

We did our work in Washington, D.C., in June 1996 in accordance with generally accepted government auditing standards.

BACKGROUND

In 1969, the federal government officially adopted a measure to ascertain how many people across the country had incomes that were inadequate to meet expenses for basic needs. This U.S. measure of poverty is used in making policy decisions, administering programs, conducting analytical research, allocating federal funds, and in general increasing public understanding of the extent of economic hardship. For example, the official poverty measure is used in allocating federal assistance for local educational agencies and in describing poverty trends.

This official poverty measure was based on the findings of the U.S. Department of Agriculture's (USDA) 1955 Survey of Food Consumption that, on average, families of three or more persons spend one-third of their income on food. Poverty status for a family of three or more was defined as an income level equal to or less than three times the cost of the economy food plan, the least costly food plan designed by USDA. The food costs were published by sex and age of individuals. Food costs for various

family sizes were calculated by using the number, sex, and age of children.⁴

Poverty thresholds, of which there are currently 48, have been updated annually, to adjust for the change in prices nationwide, and published the following year. Thus, in 1994—the year of the most recent update—a family of four with a cash income of less than \$15,141 was considered to be living in poverty.

The problems in measuring poverty are well documented. For example, in 1990, Patricia Ruggles, formerly a senior research associate at the Urban Institute, stated that, when poverty measures were introduced in the mid-1960s, they probably identified people with truly inadequate access to goods and services fairly well.⁵ She noted that, by 1990, the data and poverty standards that underlie the measures were very outdated. She concluded that the official "poverty line" no longer realistically reflected a standard of need for a minimally adequate level of consumption.

In 1995, the National Research Council's Panel on Poverty and Family Assistance of the Committee on National Statistics (CNSTAT) concluded that the official measure of poverty needed to be revised and made specific recommendations to the Statistical Policy Office in OMB to do so.⁶ The CNSTAT panel noted that the conceptual basis of the official measure had remained virtually unchanged over the past 30 years, during which time marked changes had occurred in the nation's economy. The panel said that changes in society and in public policies, which had affected families' economic well-being, were not reflected in the official poverty measure.

Both Dr. Ruggles and the CNSTAT panel detailed the numerous choices and assumptions that must be addressed in the measurement of poverty. One concept that must be addressed involves equivalence scales, which are measures of the relative welfare levels enjoyed by families of different sizes and compositions. Equivalence scales are used in the measurement of poverty to adjust the thresholds for other family types in relation to the threshold for the reference family. For instance, if a family of two adults can live as well as a reference family of two adults and two children while spending only two-thirds as much, then relative to the reference family, the equivalence scale value for a two-adult family is two-thirds. According to the

⁴The original thresholds also differed by sex of the family head and by farm/nonfarm residence. In 1981, distinctions based on sex of the family head and farm/nonfarm residence were eliminated, also, thresholds were extended up to families of nine or more members.

⁵Patricia Ruggles, Drawing the Line: Alternative Poverty Measures and Their Implications for Public Policy (Washington, D C: The Urban Institute Press, 1990), p. 2.

⁶Constance F. Citro and Robert T. Michael, eds., Measuring Poverty: A New Approach (Washington, D C: National Academy Press, 1995), p. 1.

CNSTAT panel,

"a precise characterization of equivalence scales is elusive, and the many scales proposed in the literature differ not only by the usual margin of empirical uncertainty, but also in their underlying conception: different authors are not always measuring the same thing. As a result, it is possible to find a wide range of scales, which have very different implications for the total number of people in poverty as well as for the distribution of poverty among families of different types. Depending on the scale used, the poverty rate can be substantially higher or lower, and the demographic composition of those considered poor can change dramatically."⁷

Another concept to be considered in redefining poverty is the measure of economic well-being. The official measure uses a family's before-tax cash income. If one assumes consumption is a better measure of economic well-being, then various decisions have to be made in the process of measuring one's actual consumption. For example, choices would need to be made as to what data sources would be used and whose consumption would need to be included. Our later report will examine these decision points in more depth. In this letter, however, we focus on the decisions and assumptions made in one consumption-based measure of poverty.

RESULTS IN BRIEF

In developing or evaluating any poverty measure, one must take into account certain assumptions and choices. According to some researchers, consumption may be a better conceptual basis for measuring poverty than the official measure, which is based on a family's before-tax cash income. However, adequate data on household consumption are not currently available. Recognizing this, Dr. Slesnick used three data sources to develop a consumption-based poverty measure, which in turn yielded a poverty rate of 8.4 percent in 1989. This rate was lower than the 12.8 percent rate for that year yielded by the official poverty measure.⁸

The difference between the official measure and Dr. Slesnick's consumption-based poverty measure primarily can be found in differences in (1) the dollar amounts of the thresholds; (2) the measure of economic well-being (income or consumption); and (3) the manner in which he used equivalence scales, cost-of-living indexes to measure

⁷Citro and Michael, pp. 159-160

⁸In its comments on a draft of this letter, OMB stated that a more appropriate comparison of poverty measures would be to compare Dr. Slesnick's consumption-based measure with an alternative measure of poverty that more closely paralleled his concept of consumption

inflation, and data to place the U.S. population into household groupings. Specifically, Dr. Slesnick used the following approach in his consumption-based poverty measure to arrive at the 8.4 percent poverty rate for 1989.

- He used a poverty threshold for a four-person reference family, which was different from the official measure's threshold. Despite the difference, he viewed these thresholds to be conceptually consistent because both determined how much a family would have to spend to maintain a subsistence level of living.
- Using the Consumer Expenditure Survey (CEX), which collects expenditure data directly from households,⁹ he developed separate equivalence scales for hypothetical household groups. To do so, he used demographic household characteristics of family size; age, sex, and race of the head of the household; region of residence; and rural and urban residence. He then applied these scales to a four-person reference family threshold and produced poverty thresholds. (The official poverty measure does not incorporate all of these demographic characteristics.)
- To determine who fell below the poverty thresholds, he estimated the dollar amounts of goods and services that hypothetical households consumed each year. To do so, he used CEX data for the years in which those data were collected. He estimated the dollar amounts for the years between CEX data collections. He used Personal Consumption Expenditures (PCE) data, which aggregate expenditure data from businesses, to estimate household consumption for the years prior to 1960 in his study. (The official measure uses family income as collected annually by the Bureau of the Census in determining economic well-being.)
- He adjusted the household consumption dollar amounts for inflation using household-specific cost-of-living indexes that he developed. He used CEX and PCE data to calculate these indexes at different levels of consumption for groups of hypothetical households. (A similar adjustment is not made in the official measure.)
- He allocated the U.S. population to the hypothetical household groups for the years in which the CEX data were not collected by using household demographic information from the Current Population Survey (CPS), which collects labor force

⁹The CEX collects data from "consumer units," which are defined either as financially independent unrelated individuals or groups of individuals who pool their resources to make joint consumption decisions. The official measure makes a determination of poverty status for unrelated individuals and for persons living in families, which are groups of two or more persons related by birth, marriage, or adoption who reside together. Dr. Slesnick used the terms families and households interchangeably. For example, he most frequently used the term households in his writings, but used family size as a demographic attribute of the households.

information from households. (Similar allocations are not made in the official measure.)

Dr. Slesnick recognized limitations in the data he had used to calculate his consumption-based poverty measure and wanted to determine how the use of different consumption data would affect his results. Accordingly, to test the sensitivity of his poverty measure to differences in data sources, Dr. Slesnick used a per capita ratio of expenditures from the PCE and CEX data sources. In this test, he multiplied the hypothetical households' dollar amounts of consumption by these ratios. This increased the consumption amounts by one-half for the 1980s and by lesser amounts for the 1970s and 1960s, thereby decreasing the poverty rate to 2.2 percent for 1989 (as was reported in the Wall Street Journal).

While Dr. Slesnick's research showed that a consumption-based measure of poverty generally produced a lower rate than the official poverty measure, his research also showed that using different sources of consumption data has affected the size of the difference between the two measures. According to Dr. Slesnick, he did not intend that the outcome of the sensitivity analysis should be considered a poverty measure. Nonetheless, it was these poverty rates that the author of the Wall Street Journal article used to support the proposition that the consumption of goods and services, rather than family income, should be used to measure economic well-being for the purpose of identifying the poor.

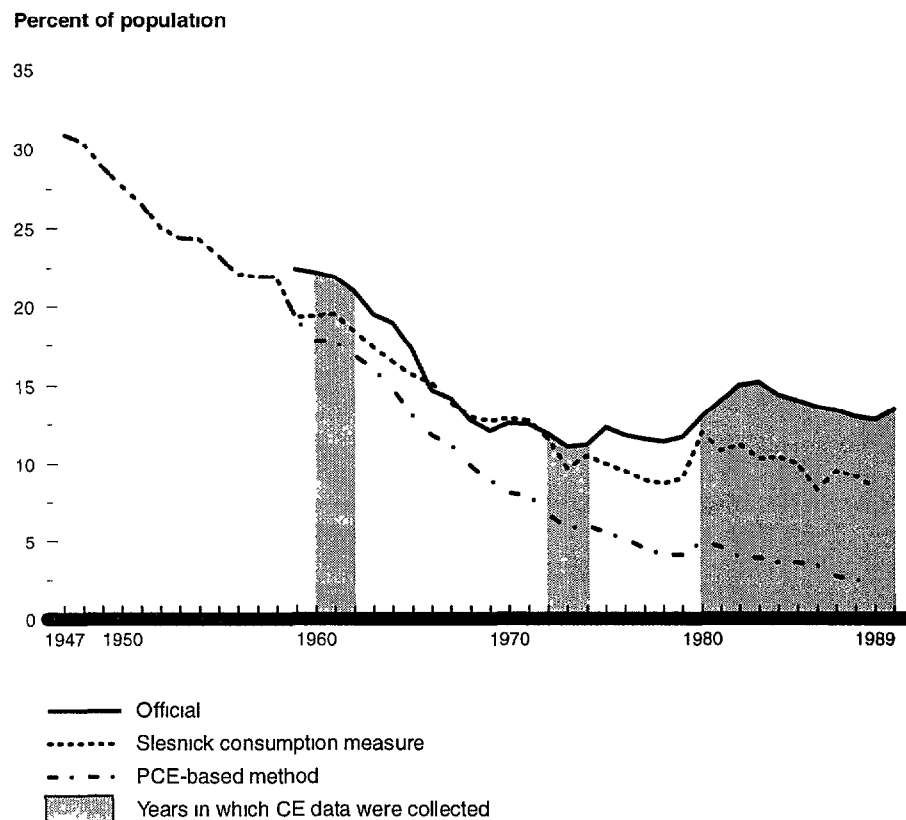
In evaluating any poverty measure, one must take into account the assumptions and choices that have been made on the basis of the researcher's judgments and the type and amount of measurement error that may be associated with the resulting poverty rate estimates. These assumptions and choices often reflect judgments on the part of the researchers. For example, in selecting consumption rather than income, Dr. Slesnick assumed that consumption of goods and services was a better measure of economic well-being. Because U.S. household consumption expenditure data are not available for individual households for analysis for the years prior to 1960, Dr. Slesnick approximated what these data would have been. To do so, he used PCE data, even though he recognized that they could not be adjusted to precisely match household consumption expenditures as recorded in the CEX.

The accuracy and reliability of the poverty rates derived from Dr. Slesnick's calculations are difficult to gauge. Because CEX data are not available at the individual household level for analysis for the years prior to 1960, there is no basis for assessing the accuracy of his estimates for the years 1947 through 1959. Because Dr. Slesnick did not assess the effect of sampling error in some of his data sources on his estimates, we cannot make a judgment regarding the precision of his estimates of poverty rates.

DR. SLESNICK DEVELOPED A CONSUMPTION-BASED MEASURE OF POVERTY

Through a series of articles, some of which were coauthored with Dr. Dale W. Jorgenson, a professor of economics at Harvard University, Dr. Slesnick developed measures of poverty that were based on the assumption that the appropriate indicator of well-being among the poor should be based on the consumption of goods and services, rather than on family income (which is used in the official measure).¹⁰ His alternative measure, which we reviewed, produces poverty rates that are lower than the rates obtained through the official measure of poverty (see fig. 1).

Figure 1: Poverty Rates



Note 1 The Slesnick consumption measure and the PCE-based method have the same poverty rates from 1947 through 1959

Note 2 Census has calculated poverty rates using the official measure adopted in 1969 for 1959 through 1994

Source Census and Slesnick data

¹⁰In his research results, Dr. Slesnick developed several alternative measures. We discuss the alternative measure that was tested with the methodology that produced the poverty rates described in the [Wall Street Journal](#) article

Dr. Slesnick presented his consumption-based measure of poverty in an article in the Journal of Political Economy in 1993.¹¹ In this article, Dr. Slesnick developed several alternative consumption-based measures of poverty. The Wall Street Journal article presented the results of a sensitivity analysis—a test to assess the magnitude of change resulting from alterations to the values of key variables—that Dr. Slesnick used to assess how sensitive his alternative measures were to the consumption data that he used. We asked the author of the Wall Street Journal article the reason he chose to use the poverty rates that resulted from Dr. Slesnick's sensitivity analysis of the Slesnick consumption measure, rather than the measure itself. He told us that he used the PCE-based method because it gave the lowest poverty rate and the largest difference from the official rate, which best illustrated his point that the measure of poverty was flawed. Dr. Slesnick told us that, although he would have preferred the citation of one of his other consumption-based poverty measures for the Wall Street Journal article, he agreed with the article's central argument that the measurement of poverty is flawed because it does not consider the consumption of goods and services.

In developing the consumption-based poverty measure that we reviewed, Dr. Slesnick used data from the following three sources: (1) the CEX, (2) the PCE, and (3) the CPS.

¹¹Daniel T. Slesnick, "Gaining Ground: Poverty in the Postwar United States," Journal of Political Economy, Vol. 101, No. 1 (1993), pp. 1-38.

Table 1: Description of Sources

Source	Description	Responsible agency
CEX	Provides a continuous flow of data on the buying habits of American consumers for use in a wide variety of economic research and in support of the periodic revisions of the Consumer Price Index (CPI) ^a	BLS
PCE	Measures the goods and services purchased by the personal sector, which consists of persons resident in the United States and the nonprofit institutions serving them and includes purchases of new goods; and also services from business, net purchases of used goods, purchases of goods and services by U.S. residents traveling or working abroad, and imputed purchases.	BEA
CPS	Primarily collects labor force and income information about the civilian noninstitutional population and members of the Armed Forces living off post or with their families on posts in the United States	Census

^aThe CPI is a measure of the average change over time in the prices paid by urban consumers for a specified market basket of goods and services purchased for everyday living. The CPI is used to adjust for inflation.

Source: Agency data.

In his consumption-based measure of poverty, Dr. Slesnick began with a consumption-based poverty threshold that he viewed to be conceptually consistent with the initial income cutoff amounts in the official measure of poverty. Dr. Slesnick told us that these were conceptually consistent because they both determine how much a family would have to spend to maintain a subsistence level of living. Dr. Slesnick used a reference threshold for a four-person family living in the Northeast headed by a white, nonfarm, male, aged 25 to 34 years old in 1964.¹²

¹²The official weighted average threshold for 1964 for the four-person reference nonfarm family was \$3,169 (the weighted average was \$3,170 for male-headed families and \$3,151 for female-headed families) Dr Slesnick told us that his weighted average thresholds were \$3,598 for the four-person nonfarm family, \$3,673 for male-headed families, and \$2,436 for female-headed nonfarm families.

He applied this threshold to a more refined set of equivalence scales that he and Dr. Jorgenson had developed. These are known as J-S equivalence scales and were derived from the 1973 CEX data supplemented by information on changes in average expenditure patterns in the PCE data.¹³ Dr. Jorgenson and Dr. Slesnick, using demographic household characteristics of family size, age and race of the head of the household, region of residence, and rural and urban residence, calculated J-S equivalence scales for 672 household groups. Dr. Slesnick told us that he later developed separate J-S equivalence scales for female-headed and male-headed households,¹⁴ which resulted in a total of 1,344 equivalence scales. By applying the J-S equivalence scales to the \$2,963 for a four-person reference family, Dr. Slesnick developed 1,344 poverty thresholds.

Next, to determine the number of people who fell below their respective household poverty threshold, Dr. Slesnick estimated the dollar amounts of goods and services that each of the different types of hypothetical households consumed each year.¹⁵ These dollar amounts were used to represent the households' economic well-being. For the years in which CEX data were collected, Dr. Slesnick used these data. However, he had to approximate the amounts for years in which CEX data were not collected.

Dr. Slesnick used CEX data for 13 years—from 1960 through 1961,¹⁶ 1972, 1973, and 1980 through 1989—to calculate the dollar amounts of consumption for households identified by specific characteristics, such as race, sex, and age of household head.¹⁷ Dr. Slesnick adjusted the CEX totals to more nearly match a concept of consumption by subtracting gifts and contributions to persons and organizations outside of the household. In addition, Dr. Slesnick subtracted contributions to pensions, retirement funds, and Social Security because he identified these expenditures as saving rather

¹³Dale W. Jorgenson and Daniel T. Slesnick, "Aggregate Consumer Behavior and Household Equivalence Scales," *Journal of Business & Economic Statistics*, Vol. 5 (April 1987), pp. 219-232.

¹⁴In 1981, separate thresholds by sex of the head of household were eliminated in the official measure because of concerns over discrimination. Distinction by race of the head of household was never in the official measure.

¹⁵To do these calculations, Dr. Slesnick used CEX consumption expenditure data as a proxy for consumption. In their comments on a draft of this letter, BLS officials said that the CEX does not collect information on consumption by households but does collect data on expenditures made by the household for its own use.

¹⁶Dr. Slesnick told us that he used the same data points for both 1960 and 1961 from the 1960 through 1961 CEX.

¹⁷The survey design used in the CEX changed significantly from 1960 to 1989. For example, expenditures made by college students living away from home were to be included among the expenditures reported by their families in 1972 and 1973. According to BLS, some researchers suspect that such expenditures were underreported in this survey design. Since 1980, these expenditures have been directly reported by college students who are CEX survey respondents. According to BLS, some of the differences in survey design could affect Dr. Slesnick's results.

than consumption. He did not subtract life insurance premiums, which some may consider saving. He used the rental equivalence value of owner-occupied homes, which represents the cost of consuming housing services, rather than using homeowners' expenditures that also reflect the investment aspect of owning a house. Dr. Slesnick made an adjustment that was similar to rental equivalence for the purchase of consumer durables, such as vehicles and appliances.¹⁸

In his definition of consumption, Dr. Slesnick included expenditures resulting from food stamps and meals and rent received as pay. He did not make adjustments for consumption resulting from other forms of government assistance, such as school lunch subsidies, Medicare benefits, Medicaid benefits, and housing subsidies.

Because CEX data had not been collected for every year from 1947 through 1979, he approximated, or interpolated, the dollar amounts of consumption for the 1,344 hypothetical household groups for the years in which CEX data were not collected. (See the shaded areas in fig. 1 for the years in which CEX data were collected.) For the years 1947 through 1959, Dr. Slesnick used PCE data. For each of these years, he used the household groups' 1961 dollar amounts of consumption and adjusted them to equal the aggregate expenditure amounts of the 1947 through 1959 PCE data.¹⁹

Next, to adjust the amounts of the different years to a single base comparison year, Dr. Slesnick adjusted the hypothetical households' dollar amounts of consumption for inflation by constructing household-specific price indexes.²⁰ To develop, or simulate, these indexes, Dr. Jorgenson and Dr. Slesnick used CEX data as well as PCE data for the years 1947 through 1989. They simulated cost-of-living indexes for individual households at 12 consumption levels in the 1,344 groups (i.e., a total of 16,128 households). Next, they applied these index values to the corresponding households to obtain each household's 1973 constant-dollar amounts of consumption for 1947 through 1989.²¹

¹⁸Dr. Slesnick used an inventory of consumer durables in the 1973 CEX to estimate the value of services from them. These estimates were used to derive values for the other years in Dr. Slesnick's analysis.

¹⁹In his comments on a draft of this letter, Dr. Slesnick said that since the differences between the CEX and the PCE were quite small in 1960 compared to the later years, he felt it was reasonable to approximate the overall consumption levels by the PCE over the period from 1947 through 1959.

²⁰The indexes are described in Dale W. Jorgenson and Daniel T. Slesnick, "Individual and Social Cost-of-Living Indexes," in Price Level Measurement, ed. W. E. Diewert (New York: North-Holland, 1990), pp. 155-234.

²¹A constant-dollar value is measured in terms of prices of a base period to remove the influence of inflation. The resulting constant-dollar value is the value that would exist if prices had remained the same as those in the base period.

Dr. Slesnick then allocated the proportion of the U.S. population to household groups defined by demographic variables, such as household size and region of residence, using sample survey data from either the CEX (for 13 years) or the CPS (for the remaining 29 years).

Finally, Dr. Slesnick used the previously developed hypothetical households' dollar amounts of consumption to determine the poverty status of each household and the poverty rate for the population as a whole.

As shown in figure 1, the poverty rates resulting from the Slesnick consumption measure of poverty range from a high of 30.9 percent in 1947 to a low of 8.3 percent in 1986. Dr. Slesnick told us that he did not analyze the effects that sampling errors in the CEX data or the CPS data have on the accuracy of his estimates of poverty rates. Both data sets are based on sample surveys of the population of the United States and like other sample surveys are subject to both nonsampling and sampling error. Sampling errors occur because a small part of the total population is included in the sample survey.²² Nonsampling errors in surveys come from other sources, such as mistakes in the coding of the survey responses. An adequate assessment of the effect of sampling errors on Dr. Slesnick's estimate would require an in-depth examination of such error derived from the particular estimation procedures he used in the Slesnick consumption measure to derive the poverty rates. For the 13 years using only CEX data, the effect of the complex survey design would need to be evaluated. For all other years that combine approximated or interpolated dollar amounts of consumption from the CEX with the population data from CPS, the combined effects of sampling errors in both the CEX and CPS would need to be evaluated.²³

DR. SLESNICK TESTED HIS CONSUMPTION-BASED MEASURE OF POVERTY

To assess the sensitivity of the results of his analysis to changes in the underlying assumptions of his consumption-based measure of poverty, Dr. Slesnick performed various tests. In one test, involving an adjustment to the data that he used to determine the dollar amounts of consumption, Dr. Slesnick began by noting that his consumption-based measure produced poverty rates that were lower than those

²²The CEX sample sizes have varied over the years from about 14,000 consumer units for 1960 through 1961, to about 10,000 each year in 1972 through 1973, to more than 5,000 per quarter for each year from 1980. The CPS sample sizes increased from 21,000 in the years 1947 through 1956 to 48,000 in the years 1967 through 1971. CPS sample sizes increased again from 45,000 in 1972 to the largest sample size of 65,500 in 1980 through 1981. Sample sizes then declined to 53,600 in 1989.

²³In his comments on a draft of this letter, Dr. Slesnick pointed out that he used CEX data to assess assumptions about the distributions of expenditures within groups of households. In the evaluation, which is published on page 35 of his Journal of Political Economy article, he suggests that the results provided a reasonable basis for using these procedures in the years for which CEX data are unavailable.

obtained by using the official measure, and then stated that the difference might lead one to suspect that the expenditures reported in the CEX were too high. To examine the question of whether the source of the consumption data had a significant effect on the results, Dr. Slesnick compared the aggregate expenditure levels from the CEX, which are gathered from households, and PCE, which are gathered from businesses. He noted that the PCE levels were uniformly higher than those reported in the CEX, which he attributed, in part, to differences in the definitions of consumption used and underreporting in the CEX.²⁴ Dr. Slesnick told us that he was not convinced that the PCE was the appropriate consumption concept or the standard against which the CEX should be judged. In addition, he said that he felt it was necessary to assess the sensitivity of his results by using an alternative definition of consumption.

To assess his concept of consumption, for the years 1960 through 1989, Dr. Slesnick multiplied the dollar amounts of consumption for the 1,344 hypothetical household groups by a ratio of PCE per capita expenditure to CEX per capita expenditure. In calculating the PCE per capita expenditure, Dr. Slesnick used the PCE rental equivalence value of owner-occupied housing and made an adjustment for consumer durables, such as vehicles and appliances, that was similar to the adjustment he made for consumer durables in the CEX. Dr. Slesnick said that he did not subtract gifts from the PCE data, as he did with the CEX data, because gifts could not be identified in the PCE data. He also said that he did not adjust the health care expenditures in the PCE data so that they would be similar to the out-of-pocket expenditures that are reported in the CEX. Dr. Slesnick also did not include child support or alimony payments that are reported as expenditures in the CEX; these are not included in the PCE.

The per capita ratio values that resulted from his calculations ranged from 1.56 for 1987 to 1.06 for 1961. Applying these ratios to the dollar amounts of consumption for the 1,344 household groups had the effect of increasing the dollar amounts of consumption. For example, a CEX consumption amount of \$10,000 in 1987 would increase to \$15,600; a CEX consumption amount of \$10,000 in 1961 would increase to \$10,600. As shown in figure 1, the poverty rates resulting from the test Dr. Slesnick did on his consumption measure of poverty ranged from 30.9 percent in 1947 to 2.2 percent in 1989.²⁵ The application of the per capita ratios reduced the poverty rates that were obtained with the Slesnick consumption measure of poverty by an average

²⁴Daniel T. Slesnick, "Aggregate Consumption and Saving in the Postwar United States," Review of Economics and Statistics, Vol. 74 (1992), pp. 585-597.

²⁵In his comments on a draft of this letter, Dr. Slesnick said that he obtained similar poverty rates with a measure that used the per capita ratio adjustment for consumption, the official poverty thresholds, and an adjustment for inflation that is based on PCE data.

of about 8 percent in the early 1960s and by an average of slightly less than 70 percent in the late 1980s.

Many factors might contribute to differences in the aggregate expenditures reported in the PCE and CEX. One that BLS pointed out is a change that began with a change in the CEX survey design in 1980. In addition, beginning with the 1972 through 1973 CEX, expenditure data were collected in two separate surveys: the interview and the diary surveys. Dr. Slesnick used data from the interview survey that, according to BLS, accounts for 90 to 95 percent of a household's total expenditures. In addition, Dr. Slesnick used data from the second quarter interview survey and multiplied those amounts by four to represent annual CEX data. According to BLS, using this process generates expenditure amounts that are different from using four quarters of CEX data to represent annual CEX amounts.

Dr. Slesnick concluded from the sensitivity analysis of his concept of consumption that, "if one views the PCE as the right estimate [of consumption], the actual consumption-based poverty rates are probably much lower than those presented in...[his article]...and the CEX-based estimates of poverty are likely too high."²⁶

Nonetheless, this methodology is one of several sensitivity tests that Dr. Slesnick devised on the basis of his consumption-based measure and that he discussed in his Journal of Political Economy article. Other tests produced poverty rates that were higher than the alternative measure and its sensitivity test that we discuss in this letter. A thorough evaluation of the Slesnick consumption measure of poverty would include these and additional sensitivity tests that are not included in his article.

DIFFERENCES BETWEEN ESTIMATES OF CONSUMER SPENDING IN THE PCE AND CEX DATA CANNOT BE FULLY RECONCILED

Neither the PCE nor the CEX produced the estimates of consumption that would be required in a consumption-based measure of poverty, such as the Slesnick consumption measure of poverty. As described in enclosure I, each of these data sources measures different aspects of expenditure gathered from different sources (i.e., businesses for the PCE and households for the CEX), and therefore, adjustments to fully reconcile the differences between them are not possible.

We note that the comparison of the PCE and CEX in enclosure I is of the integrated

²⁶Dr. Daniel T. Slesnick, letter to GAO, June 18, 1996. Also, in his comments on a draft of this letter, Dr. Slesnick said, "Economists are aware of the definitional (and coverage) differences, but many believe that the PCE represents the more accurate measure. Indeed, virtually every macroeconomist uses the PCE to measure aggregate consumption levels in the U.S. As a result, I felt it was necessary to tabulate a poverty rate that was consistent with this alternative, more widely-used definition."

CEX data from both the interview and diary surveys. Since Dr. Slesnick only used data from the interview survey in constructing his consumption-based poverty measure, he, therefore, did not include such items, as gambling losses, which are included in the CEX diary survey and the PCE. Also, the comparison in enclosure I is of the CEX under the survey design used in the 1980s and is not applicable for the CEX under prior survey designs. Therefore, there are additional differences to those mentioned in enclosure I that would contribute to Dr. Slesnick's results.

BEA conducted a comparison of the differences in consumer expenditures in 1992 between the PCE and CEX data sources.²⁷ BEA's analysis showed that of the \$1,151.7 billion difference in 1992 between the PCE and CEX measures of consumer spending, more than half was traceable to coverage and definitional differences, with the remainder due to statistical differences. According to Dr. Slesnick, about half of the difference between the PCE and CEX data sources can be attributable to definitional differences. In his study, he was unable to determine the sources of remaining discrepancies but noted that underreporting in the CEX "undoubtedly contributes to some of the differences."²⁸

OBSERVATIONS

Assumptions and choices have to be made when developing or evaluating a poverty measure. And, while we have not drawn conclusions on their use, we believe it is important to identify some of the key assumptions and choices involved in Dr. Slesnick's consumption-based poverty measure, which are as follows:

- In selecting consumption rather than income, Dr. Slesnick assumed that consumption of goods and services is a better measure of economic well-being. Although he included expenditures resulting from food stamps and meals and rent received as pay, he did not include other noncash benefits, such as Medicaid expenditures, in his consumption-based measure of poverty, which would affect his results.²⁹
- He assumed that equivalence scales should be stratified by demographic factors, such as sex and race of the head of household. (The distinction of sex of the

²⁷"Reconciliation of PCE and Consumer Expenditure Survey Estimates of Consumer Spending," Preliminary Draft, Bureau of Economic Analysis, September 7, 1994

²⁸Dr. Slesnick studied the \$1,224 billion difference for 1989. See Slesnick, 1992, pp. 585, 594.

²⁹In its comments on a draft of this letter, OMB noted that Dr. Slesnick compared his consumption-based poverty measures to the official poverty measure, rather than to an alternative poverty measure that adjusts for noncash benefits.

head of household was eliminated in the official measure because of concern over discrimination. Distinction by race of the head of household was never in the official measure.)

- He chose to use simulated household-specific cost-of-living indexes, rather than the CPI or PCE data, to measure inflation.
- Recognizing the differences between the PCE and CEX data sources, he made the choice to use PCE data to fill in for missing CEX data. Neither data source was designed to measure consumption as it would be done in a consumption-based poverty measure. Thus, as evidenced by Dr. Slesnick's sensitivity analysis, the use of these sources yields different results. According to BLS, the CEX and PCE data sources cannot be completely reconciled, and the PCE data cannot be adjusted to measure household consumption in a manner appropriate for use in a poverty measure.

The measurement of expenditures in the CEX and the PCE data sources differ to such an extent that adjustments cannot be made to produce an overall measure of consumption, as would be needed to use consumption to measure the economic well-being of individuals living in households. Dr. Slesnick, aware of these measurement problems, used a ratio of the two data sources to assess his consumption measure of poverty. According to Dr. Slesnick, it was not his intention to have the results of this sensitivity analysis be used as a measure of poverty. Instead, he wanted to show the effect of different methods of measuring consumption with two sources of expenditure data. His results indicate that the data sources used to define economic well-being do have a large effect in a consumption-based measure of poverty. Adjusting data that were collected directly from households, such as the CEX, with data collected mainly from businesses, such as the PCE data, lowers the poverty rate on average by more than one-half the rate obtained with household data only.

AGENCY COMMENTS

We requested comments on a draft of this letter from Dr. Slesnick, the Acting Director of OMB, the Secretary of Labor, and the Secretary of Commerce.

Dr. Slesnick provided written comments, dated August 5, 1996, in which he stated that we did an excellent job in describing his consumption-based poverty measure. He highlighted several points. He said that in his view, consumption represented a more appropriate basis for the measurement of poverty; poverty rates calculated using consumption are generally lower than comparable income-based estimates; and the difference in rates is due to the equivalence scale used, price index used to adjust the poverty thresholds, and the definition of consumption. He noted that many

economists believe that the PCE represents a more accurate measure of consumption than the CEX and that the rates that he obtained through the PCE-based method were low because the PCE estimates of consumption are much higher than those based on the CEX. He said that he would not represent the results from the PCE-based method as estimates of a consumption-based poverty rate and that he was not convinced that such an adjustment is appropriate. In addition, he suggested some specific changes on technical points concerning the way he computed the poverty rates using CEX data. We incorporated these changes where appropriate in this letter.

On August 2, 1996, we met with BLS' Chief of the Consumer Expenditure Surveys Division and another BLS staff member, who suggested technical corrections. These primarily concerned our discussion of the CEX, and we adopted their suggestions where appropriate in this letter.

On August 12, 1996, we met with the U.S. Chief Statistician in OMB and other OMB staff, who generally concurred with the information in this letter but pointed out that it would be helpful to determine the extent to which each of several factors used in Dr. Slesnick's analysis accounts for the difference between the 12.8 percent official poverty rate for 1989 and the 8.4 percent derived by Dr. Slesnick. OMB officials also pointed out that the extent of the difference between the two estimates depends on how consumption and income are measured. For example, OMB noted that the official poverty measure does not reflect food stamps, other types of noncash benefits, or the effects of taxes, while Dr. Slesnick's consumption measure reflects food stamps and some effects of taxes.³⁰ OMB shared its preliminary analysis showing that nearly half the specific portion of the difference between the official poverty rate for 1989 and Dr. Slesnick's, which he attributes to substituting expenditure for income data, disappears when an income measure more closely paralleling Dr. Slesnick's expenditure measure is used.

We agree with OMB that how one defines consumption and income may affect poverty rates. In addition, we agree with OMB that factors other than using consumption to measure economic well-being contributed to the difference between the official measure and the Slesnick consumption-based measure of poverty. However, we did not study the alternative measures of income in our review to make a determination on which alternative measure of income is most appropriate for comparison to the Slesnick consumption-based poverty measures. Further, we did not have the data necessary for an analysis that would determine how much each of the factors in Dr. Slesnick's measure contributed to the difference in poverty rates. OMB officials also suggested technical changes, which we adopted where appropriate.

³⁰Dr. Slesnick told us that sales taxes are included in his estimates of consumption and that he did not include other forms of taxes because he did not consider them to be consumption.

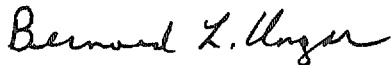
The Secretary of Commerce provided written comments, dated August 21, 1996, which addressed the draft's description of BEA's estimate of the PCE. The Secretary did not comment on the appropriateness of the measure of poverty. He emphasized that BEA's role in this review was limited to providing data and information on the coverage of the PCE and to discussing the technical differences between the CEX and the PCE. The Secretary also noted that the PCE is part of the national income and product accounts and is governed by the concepts underlying these accounts. Commerce made a number of technical suggestions to improve the precision of the descriptions of these concepts contained in our draft letter. Although we modified our letter in each instance to improve the precision of our description of BEA's concepts, we did not always use the suggested language because we believe it is too technical for readers who are not experts in this area. Detailed descriptions of these concepts are presented in BEA's publications, including National Income and Product Accounts, Volume 2, 1959-88, Personal Consumption Expenditures, Methodology Paper Series MP-6, and Benchmark Input-Output Accounts of the United States, 1987.

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We are sending copies of this letter to the Chairman, Senate Committee on Finance; the Secretary of Commerce and the Director of BEA; the Secretary of Labor and the Commissioner of BLS; the Acting Director of OMB and the Chief Statistician; and Dr. Slesnick. We will also make copies available to others on request.

Major contributors to this letter were Kathleen K. Scholl, Kiki Theodoropoulos, Victoria E. Miller, and Jacqueline E. Matthews. If you have any questions regarding this issue or would like to discuss it further, please call me on (202) 512-4232 or Kathleen Scholl on (202) 512-7262.

Sincerely yours,



Bernard L. Ungar
Associate Director
Federal Management
and Workforce Issues

DIFFERENCES BETWEEN THE PCE AND CEX

This enclosure describes differences between the PCE and CEX, which measure different aspects of expenditure. These differences in coverage, definition, and data sources are summarized in table I.1.

Table I.1: Differences Between the PCE and CEX

Differences	PCE	CEX
Population coverage		
Civilian noninstitutional population, including all U.S. residents	X	X
U.S. military personnel on post in the United States and abroad	X	
Employees of U.S. businesses working abroad 1 year or less	X	
U.S. government civilian personnel stationed abroad 1 year or less	X	
Nonprofit institutions serving individuals	X	
Definitions of expenditures		
Type		
Out-of-pocket expenditures for goods and services	X	X
Full cost of each purchase, regardless of timing of payments	X	X
Purchases for business use		
Government expenditures on behalf of individuals for medical and educational services	X	
Purchases of nonprofit institutions serving individuals	X	
Imputations		
Services furnished without payment by financial intermediaries ^a	X	

Differences	PCE	CEX
Expense of handling life insurance	X	
Commissions on securities transactions	X	
Space rental value of owner-occupied housing	X	
Rent and meals as pay ^b	X	X
Farm products consumed on farms	X	
Employer-paid health insurance premiums including workers' compensation	X	
Standard clothing issued to military personnel	X	
Services (rental value) of fixed assets owned and used by nonprofit institutions serving individuals	X	
Vehicle purchases		
Trade-in of used vehicles netted	X	X
Sale of used vehicles netted	X	
Finance charges		X
Vehicle registration and drivers' license fees		X
Other expenditures		
Repair and maintenance expenditures, owner-occupied housing		X
Mortgage interest, owner-occupied housing		X
Premiums, homeowners insurance ^c		X
Parimutuel losses	X	X
Casino gambling losses	X	X
Lottery losses	X	X
Alimony and child support payments		X
Contributions to charities and other organizations		X
Appliances (except built-in) included in new home purchase	X	

Differences	PCE	CEX
Life insurance premiums		X
Commissions on securities transactions	X	
Employee-and individually-paid health insurance premiums	X	X
Property-casualty insurance premiums excluding homeowners' and workers' compensation	X	X
Finance-charges excluding mortgage and vehicle		X
Personal contributions to old age, survivors, disability, and hospital insurance (including Medicare Part B)		X
Personal contributions to government employee and railroad retirement funds		X
Personal contributions to private pension and retirement funds		X
Primary data sources		
Household surveys		X
Census shipments, sales, and receipts of domestic establishments and exports and imports of goods	X	

^aExcludes life insurance carriers and private noninsured pension plans

^bPCE includes military meals

^cOnly the portion of homeowners' insurance that insures household contents is included in PCE.

Source BEA and BLS

COVERAGE DIFFERENCES

The PCE and CEX both cover the expenditures of the civilian noninstitutional population—which includes all U.S. residents, military families living off post, and U.S. residents traveling overseas. In addition, PCE data cover U.S. military personnel living on post in the United States and abroad, employees of U.S. businesses sent abroad on assignments for 1 year or less; civilian employees of the U.S. government and living abroad, regardless of duration of assignment; and nonresidents travelling in the United States. The personal

sector of BEA's National Income and Product Accounts (NIPA)¹ includes nonprofit institutions serving individuals, and PCE includes their purchases of goods and services, except for purchases of structures and equipment from businesses, individuals, and government. Purchases of structures and equipment by these institutions are treated as business investment in the NIPA. An imputed value of the services of these assets is also included in PCE.

DEFINITIONAL DIFFERENCES

The following are types of definitional differences that exist in a comparison of the PCE and CEX. Even when both data sources include the same items, differences may exist because of the nature of each survey's design. For example, CEX is designed to measure out-of-pocket expenditures by consumer units. According to BLS, it is a unique and valuable source of data for analyzing spending patterns by demographic groups.

Government Expenditures on Behalf of Individuals for Medical and Educational Services

PCE for medical care includes personal health care financed by all sources of funding, including government-financed health care under Medicare, Medicaid, and other related government programs and commercially funded health insurance. CEX covers out-of-pocket expenditures for medical care and, therefore, does not include any third-party payments, such as reimbursements by insurance companies or payments by someone outside the household. PCE for educational services includes tuition paid to public schools. The CEX includes tuition paid to both public and private schools, but the CEX does not include government grants for higher education for similar reasons.

Purchases of Nonprofit Institutions Serving Individuals

PCE includes the operating expenses of nonprofit institutions, including the imputed value of the service of fixed assets owned and used by these institutions, minus receipts from their sales of goods and services to individuals. The CEX does not include the purchases of nonprofit institutions serving individuals.

Imputations

In the CEX, imputations are designed to provide estimates for nonrelated values, such as when respondents report that they had an expense but are unable to give an amount. In addition, when respondents give a global amount for a category of expenditures, BLS allocates that amount over various expenditure items. In contrast, imputations in PCE

¹The NIPA contain detailed descriptions of the overall U S economy and depicts in dollar terms the volume, composition, and use of the nation's output of goods and services

place a market value on certain transactions that do not occur in a market economy and (as in the rest of the NIPA) are designed to provide more useful analytical measures. For example, purchases are imputed to keep PCE invariant to changes in the way certain activities are carried out—whether housing is rented or owned or whether employees are paid in cash or in kind. The only imputations in the CEX and PCE that are comparable are rent and meals as pay.

For owner-occupied dwellings, the CEX and PCE measures are not comparable. Both PCE and CEX include expenditure estimates for rent and meals as pay. However, the CEX includes direct expenses (i.e., interest, taxes, insurance, maintenance, and repairs), while PCE imputes rental values based on rent for similarly valued rental properties. PCE estimates are adjusted only to remove payments for utilities.

PCE includes imputations for financial intermediaries (except life insurance carriers and noninsured private pension plans) to reflect the estimated values of service charges that the intermediary does not collect directly. The CEX does not include such an imputation for financial intermediaries.

PCE includes imputations for indirectly charged commissions on certain securities transactions and farm products consumed on farms, while the CEX does not include these items. PCE includes employer- and employee-paid premiums that are paid to private health insurers. The CEX includes employee-paid premiums, not employer-paid premiums, in its measure of consumer expenditures.

Vehicle Purchases

PCE measures the value of new and used motor vehicles purchased by individuals, less the value of sales (including trade-ins) of used vehicles. Transactions between individuals are not included nor are any other types of used goods, because they cancel in the aggregation of personal sector transactions. CEX estimates of vehicle expenditures cover purchases between households as well as purchases by households from businesses such as car dealers. The CEX measures the value of new and used motor vehicles purchased by individuals, including purchases from other individuals, and subtracts the trade-in value of used vehicles, but not the value of vehicles sold directly to either businesses or other individuals. The CEX includes vehicle finance charges in its measure of private transportation expenditures, but the PCE does not include them because finance charges appear in the NIPA as interest paid by persons, which along with PCE is a part of personal outlays. Vehicle registration and driver's license fees are included in the CEX measure of private transportation expenditures. PCE does not include these fees because these expenditures appear elsewhere in the NIPA as personal nontax payments.

Gambling Losses

Both the PCE and CEX include losses from parimutuel betting, casino gambling, and lotteries in their measures of consumer expenditures. According to BLS officials, although the term casino gambling is not explicitly mentioned when collecting CEX data and there is no separate category for it, the CEX includes net expenditures for all types of gambling.

Alimony and Child Support Payments

The CEX includes alimony and child support payments as part of its measure of consumer expenditures. Because these expenditure items are intrasectoral transfers in the NIPA, PCE does not include these items.

Employee Contributions to Social Security and Payments to Nonprofit Organizations

The CEX includes employee contributions to Social Security as part of its measure of consumer expenditures. Because this expenditure item is part of personal contributions for social insurance in the NIPA, it is not included in PCE. Also, the CEX includes contributions to nonprofit organizations by households in its expenditures. These contributions are excluded from PCE.

The CEX includes contributions to Medicare and out-of-pocket Medicare premiums by all households who make them, regardless of employment status, as part of its measure of consumer expenditures. Because this expenditure item is treated as personal contributions for social insurance in the NIPA, the PCE excludes employer and employee contributions to Medicare and individuals' payments of Medicare premiums.

Appliance Expenditures

PCE estimates of appliance expenditures include appliances that are included in a new house purchase only to the extent that they have portability; built-in appliances are part of residential fixed investment. The CEX includes direct purchases of new appliances by households; appliances that are part of a house purchase price are not included in PCE because the value of the house (including appliances) is treated as the acquisition of an asset.

Life Insurance Expenditures

In the CEX, life insurance expenditures, as well as all other insurance types, are measured by out-of-pocket premium payments. Because the NIPA treat the saving of life insurance companies as saving by persons, the value of the PCE for life insurance is

— measured as their operating expenses, including depreciation, plus the profits of stock life insurance carriers.

Motor Vehicle and Household Insurance

Insurance expenditures in the CEX are out-of-pocket premium payments. PCE estimates (excluding life insurance and nonprofit insurers) are total premiums less losses incurred by insurers. These losses (benefit payments or claims) are offset in total PCE because the auto repair, medical care, and other types of expenditures for which claims are made are paid include both out-of-pocket and insurance payments. For homeowners' insurance, only the portion allocated to coverage of household contents is accounted for in PCE; insurance on residential structures is accounted for as a charge against the space rental value and is, therefore, not part of PCE.

STATISTICAL METHODOLOGY DIFFERENCES

Significant measurement differences exist between PCE and CEX estimates. These differences are due to the use of different source data and estimation procedures in the two types of estimates.

CEX estimates are based primarily on data collected from the CEX's own surveys of households—an interview survey and a self-reported diary survey. Each component of the survey queries an independent sample of 5,000 households that is representative of the U.S. population. (For the Diary survey, approximately 10,000 weekly diaries are collected each year. For the Interview survey, approximately 5,000 interviews per quarter, or 20,000 interviews, are collected each year.) Data collection is conducted by Census for BLS. The data are collected on an ongoing basis in 101 areas of the country. Following collection, the CEX data undergo several cycles of editing, coding, and checking for consistency to ensure quality control. In addition to imputation and allocation adjustments for missing data, the data are assigned to a specific month if they are collected using another time frame—for example, quarterly or annually. BLS then derives population means on the basis of adjusted survey data and independently derived population weights.

— Expenditures reported in the CEX are direct out-of-pocket expenditures. Indirect expenditures, which may be significant, may be reflected in different categories. For example, rental contracts often include utilities. Renters with such contracts would report their utilities as part of their rent. They would not report a direct expense for utilities and, therefore, the expenditure estimate for utilities would appear to be lower. Similarly, household members whose employers pay all or part of their health or life insurance report only the amount they pay for premiums. Expenses paid by employers or other parties are not included in the CEX insurance estimates.

By comparison, BEA primarily uses Census data to develop its PCE estimates, including manufacturers' shipments, international trade in goods and services, and services receipts. Benchmark estimates of the PCE are prepared every 5 years as part of the preparation by BEA of its input-output accounts. The PCE estimates are developed using the "commodity-flow" methodology. This methodology consists of the following steps: (1) estimate domestic sales (i.e., sales of commodities purchased by persons and produced in the United States, at producers' prices); (2) convert domestic sales to domestic supply (i.e., the value of domestic sales to domestic purchasers, at purchasers' prices) by adding imports, transportation costs, and trade margins to domestic sales and subtracting exports and change in trade inventories; and (3) allocate domestic supply among business, government, and persons.

The estimates of domestic sales are based on Census data on manufacturers' shipments and services industry receipts from economic censuses. The estimates of imports and exports are based on Census and BEA data on international trade in goods and services. The estimates of the change in trade inventories, transportation costs, and trade margins are based on economic census data on wholesale and retail trade sales and cost-of-goods sold, on data from trade sources, and on data from many other sources. Annual estimates of PCE are prepared by extrapolating the benchmark estimates forward and backwards using Census annual survey data on retail trade and services and trade source data on motor vehicles.

Economic census data used in the benchmark estimates of PCE are based on complete enumeration and are not subject to sampling errors; intercensal surveys used in preparing PCE estimates are subject to sampling error. The CEX is a survey of households and is subject to sampling errors. Both estimates are subject to nonsampling error.

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